

In're Patent Application of:

**OLSSON ET AL.**

Serial No. 09/147,230

Filed: 2/9/99

56. A method according to Claim 55 further comprising adjusting frame timing, upon starting, until received frames are sampled within a signal interval.

57. A method according to Claim 56 wherein adjusting the frame timing comprises adjusting the frame timing in accordance with a feed back signal so that the sampling oscillator maintains frame synchronization.

58. An ADSL or VDSL modem comprising:  
a receiver in which data is transmitted in frames each frame having a cyclic prefix which is a repetition of part of the frame, the receiver comprising a sampling oscillator and a controller for controlling said sampling oscillator and for estimating timing deviations of said sampling oscillator operating entirely on frequency domain input data.

#### REMARKS

It is believed that all of the claims are patentable over the prior art. Accordingly, after the Examiner completes a thorough examination and finds the claims patentable, a Notice of Allowance is respectfully requested in due course. Should the Examiner determine any minor informalities that need to be addressed, he is encouraged to contact the undersigned attorney at the telephone number below.

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Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version With Markings to Show Changes Made."

Respectfully submitted



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Paragraph beginning at page 5, line 24 through page 6, line 3, has been amended as follows:

Said slope of said argument function,  $\alpha_k$ , may be estimated from the equation

$$\alpha_k = \frac{1}{N} \sum_n L \frac{(X_{n,k})(Y_{n,k})}{n}$$

where N is the number of active carriers and  $(X_{n,k})(Y_{n,k})$  is the unwrapped argument function for the nth carrier in the kth frame.

Paragraph beginning at page 6, line 4 through page 6, line 9, has been amended as follows:

Said slope of said argument function,  $\alpha_k$ , may be estimated from the equation

$$\alpha_k = \frac{2}{n_2 - n_0} \left[ \sum_{n=n_1+1}^{n_2} L(X_{n,k}) / (Y_{n,k}) - \sum_{n=n_0}^{n_1} L(X_{n,k})(Y_{n,k}) \right]$$

where N is the number of active carriers,  $(X_{n,k})(Y_{n,k})$  is the unwrapped argument function for the nth active carrier in the kth frame, indices  $n_0$  and  $n_2$  are the lower and upper limits respectively of the band and index  $n_1$  divides the band into two equal parts.

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Paragraph beginning at page 8, line 3 through page 8, line 7, has been amended as follows:

Said slope of said argument function,  $\alpha_k$ , may be estimated from the equation

$$\alpha_k = \frac{1}{N} \sum_n L \frac{(X_{n,k})(Y_{n,k})}{n}$$

where N is the number of active carriers and  $(X_{n,k})(Y_{n,k})$  is the unwrapped argument function for the nth carrier in the kth frame.

Paragraph beginning at page 8, line 8 through page 8, line 13, has been amended as follows:

Said slope of said argument function,  $\alpha_k$ , may be estimated from the equation

$$\alpha_k = \frac{2}{n_2 - n_0} \left[ \sum_{n=n_1+1}^{n_2} L(X_{n,k}) / (Y_{n,k}) - \sum_{n=n_0}^{n_1} L(X_{n,k})(Y_{n,k}) \right]$$

where N is the number of active carriers,  $(X_{n,k})(Y_{n,k})$  is the unwrapped argument function for the nth active carrier in the kth frame, indices  $n_0$  and  $n_2$  are the lower and upper limits respectively of the band and index  $n_1$  divides the band into two equal parts.

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Paragraph beginning at page 11, line 19 through page 12, line 4, has been amended as follows:

The average slope,  $\alpha_k$ , of the linear part of the argument function can be calculated, as shown in equation (1), or by some other standard method, using the unwrapped argument function of  $X_k$  for the  $k$ th frame

$$\alpha_k = \frac{1}{N} \sum_n L \frac{(X_{n,k})(Y_{n,k})}{n} \dots\dots\dots(1)$$

[W]where  $N$  is the number of active carriers and  $(X_{n,k})(Y_{n,k})$  is the unwrapped argument function for the  $n$ th carrier in the  $k$ th frame.

The equation on page 12, line 14, has been amended as follows:

$$\alpha_k = \frac{2}{n_2 - n_0} \left[ \sum_{n=n_1+1}^{n_2} L(X_{n,k}) / (Y_{n,k}) - \sum_{n=n_0}^{n_1} L(X_{n,k})(Y_{n,k}) \right] \dots\dots(2)$$

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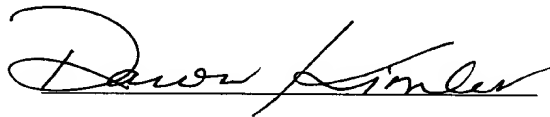
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**CERTIFICATE OF MAILING**

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: DIRECTOR, U.S. PATENT AND TRADEMARK OFFICE, WASHINGTON, D.C. 20231, on this 26<sup>th</sup> day of February, 2002.



Dawn K. Miller